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Waste Heat Recovery systems for EAF primary fumes

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A key factor to pursue the “green steel”concept, is not only the emissions reduction and the lowering of the carbon footprint of the steel plants, but also the optimization of the energy consumption.
This optimization passes, of course, primarily through the direct reduction of the energy consumption, but can be pursued also through the recovery of waste energy. In steel making plants, the Electric Arc Furnace is a big source of waste energy that is basically the thermal energy contained in the primary fumes.
Part of this thermal energy can be recovered with dedicated Waste Heat Recovery Systems that are installed directly in the EAF primary fumes line.
Several configurations can be adopted and the main difference between the different technical solutions is the output of these systems: the focus of our study are the systems designed for saturated steam production and for electrical energy production.
Both systems base their operative principle on the transfer of heat to a cooling media that flows in two different parts of the primary fumes line: the radiative parts (the cooled parts) and the convective part (the heat exchanger).
Danieli Q-STEAM is the system that allows to produce saturated steam, that can be used for processes directly inside the plant or for users outside the plant.
Danieli CHR is instead the system that is specifically designed to recover the thermal energy and produce electrical energy with the use of ORC technology.
Both systems are designed to mitigate the discontinuous process of the furnace, thanks to their accumulation systems that allow to reduce the peaks and have a more continuous output downstream.
This study analyses both technical solutions proposed by Danieli, presenting some case study applications that allow also to better understand the amount of energy that can be recovered.

Primary author: Mr FERUGLIO, Alberto (Danieli & C. Officine Meccaniche S.p.A.)

Presenter: Mr FERUGLIO, Alberto (Danieli & C. Officine Meccaniche S.p.A.)

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